

Two Aberrant New Helicarionid Land Snail Species from Northern Madagascar

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Abstract. *Microcystis* (?) *oraka*, sp. nov. and *Microcystis* (?) *tsingia*, sp. nov. are known only from dry shells collected along a stream at and near a small, isolated, karstic lens exposed within sandstone in the Andavakoera massif, north of Betsiaka, northern Madagascar. Neither of the new species fits any known genus.

INTRODUCTION

This paper is one in a series reporting taxonomic results from the author's 1992–1996 survey and inventory of Madagascar's land mollusks. During preliminary identification of helicarionids from those collections, the following two species were encountered. They are clearly new species and are so aberrant conchologically that they will likely prove to constitute new monotypic genera, if anatomical material can be obtained and compared.

The sole occurrence of these two species from and near a small, extremely isolated "island" of relatively moist limestone within a "sea" of dry sandstone, suggests they may have evolved genetically independently for a very long period. Unfortunately, their habitat was already partially degraded in 1995, and forest clearing was progressing toward it from downstream at that time. Hence the need to describe these species in advance of the author's intended monographing of Madagascar's helicarionids.

LOCALITIES

Stations 417, 418. Madagascar, 13°06'S, 49°13'E, Andavakoera massif, north of Betsiaka, dry deciduous forest, within about 10 m of stream, litter sample 2 liters. 417. 230 m, sandstone bedrock, 62.3 person-hours, 30 August 1995. 418. 115 m, limestone karstic bedrock, 31 August 1995.

METHODS AND MATERIALS

Materials were collected in 1995 using methods recommended for Madagascar rainforests by Emberton et al. (1996). Identifications and comparisons were made using Zilch (1959–1960), Fischer-Piette et al. (1994), Emberton (1994), and Emberton & Pearce (2000). Measurements were made using an ocular micrometer on a Wild M3C dissecting microscope and using a rule on photographs. Photographs were taken at standard magnifications (10× and 16×).

SYSTEMATICS

Higher classification follows Ponder & Lindberg (1997; suborder and above), Nordsieck (1986; infraorder), and Vaught (1989; superfamily and family). Types are placed in the Florida Museum of Natural History, University of Florida, Gainesville (UF); the Australian Museum, Sydney (AMS); the Muséum national d'Histoire naturelle, Paris (MNHN, which does not assign catalogue numbers to types); and the Academy of Natural Sciences of Philadelphia (ANSP). Abbreviations: ad adult(s), juv juvenile(s).

Class GASTROPODA
Clade HETEROBRANCHIA
Subclass PULMONATA
Order STYLOMMATOPHORA
Suborder SIGMURETHRA
Infraorder HELICIDA
Superfamily HELICARIONOIDEA
Family HELICARIONIDAE
Genus *Microcystis* Beck, 1837

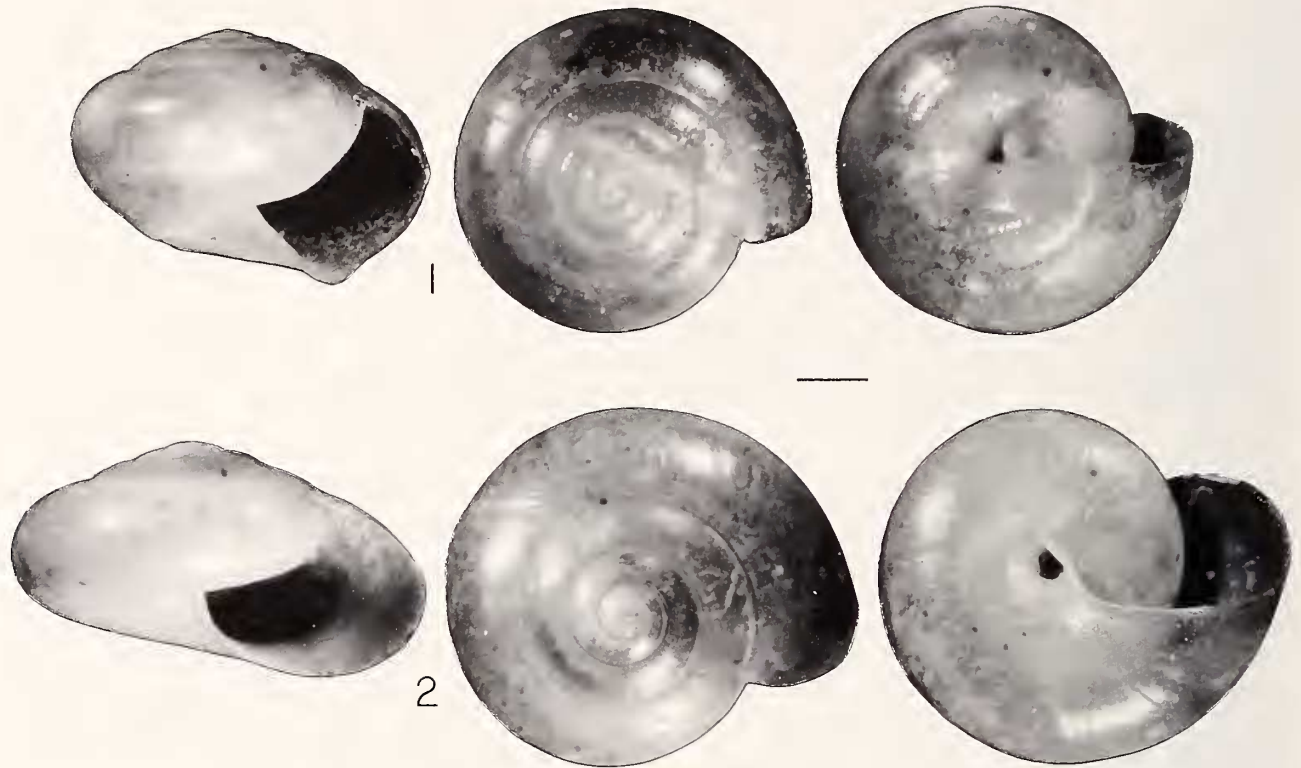
Microcystis (?) *oraka* Emberton, sp. nov.

(Figure 1)

Diagnosis: Unique among all helicarionids and among all lower-spired stylommatophorans in its basally U-shape-guttered aperture and concomitant broad, spiral ridge on the base of the shell.

Comments: This species calls to mind the Madagascan helicarionid monotypic genus *Bathia* Robson, 1914, which bears a deep, broad, subsutural, spiral groove (Fischer-Piette et al., 1994:p1. XXXI, figs. 10–12). *Bathia* was described from a single shell, but recent collections have yielded numerous examples (O. Griffiths, personal communication; Emberton, unpublished).

Neither the type locality nor any other northern-Madagascan locality contained any comparable helicarionid species of which *Microcystis* (?) *oraka*, sp. nov. could



Figures 1, 2. Holotypes in three views. Figure 1. *Microcystis (?) oraka* Emberton, sp. nov. Figure 2. *Microcystis (?) tsingia* Emberton, sp. nov. Scale bar = 1 mm.

represent a growth anomaly. The diagnostic basal spiral ridge is so regular in appearance that it seems unlikely to be a teratism or growth anomaly. A similar basal apertural gutter evolved convergently in the cyclophorid operculate land snail subgenus *Ditropis* (*Ditropopsis*) E. Smith, 1897 (Wenz, 1938–1944).

The type locality was very intensively collected (115 person-hours, 2 liters of leaf litter), but only a single dry shell was found, in spite of the fact that the limestone substrate tended to preserve shells. Thus this species either is extremely rare or occupies an unusual, highly cryptic ecological niche, or both.

Holotype: UF 285451 (1 ad): Station 418, 13°06'S, 49°13'E, Madagascar, Andavakoera massif, north of Betsiaka, 115 m, dry deciduous forest on limestone karst, 31 August 1995.

Description of holotype: Diameter 5.2 mm, height 3.7 mm, whorls 4.8, umbilicus 0.2 mm. Spire low, rounded domed-conic. Body-whorl periphery round, but subperipherally flattened in formation of a spiral basal, round-topped ridge; suture shallowly impressed; whorl shoulders rounded. Aperture lunate, wide basal valley; height 2.6 mm, width 2.5 mm; no downward deflection. Apertural lip unreflected. First 1.5 whorls 0.95 mm in diameter. Embryonic sculpture smooth. Body-whorl sculpture

smooth, lustrous, with faint irregular growth lines and with minute, parallel, closely set spiral striae barely visible at 40× magnification; spiral, round-top ridge bordered dorsally by an engraved spiral line and with stronger growth lines. Color light yellowish brown, translucent.

Etymology: Malagasy "kiss," for the uniquely puckered appearance of the apertural lip.

Microcystis (?) tsingia Emberton, sp. nov.

(Figure 2)

Diagnosis: Unique among all helicariionids and among all other stylommatophorans with thin shells and unreflected peristomes (as figured and described in Zilch, 1959–1960), in its combination of loose coiling, flattish spire, shallow sutures, open umbilicus, broadly lunate aperture, rounded whorls, nearly straight columella, small size (diameter 5.3–5.8 mm), and silky luster due to a sculpture of dense spiral lines.

Comparisons: Zonitid and urocyclid genera and subgenera that are otherwise similar have either a closed umbilicus or a much more acute spire. The zonitid *Godwinia* (*Omphalops*) H. B. Baker, 1941, however, looks similar in these respects, but has a reflexed columella.

The otherwise similar helicarionids *Helixarion* Férusac, 1821, and *Malagarion* Tillier, 1979, are both imperforate and more loosely coiled.

The helicarionid ariophantines *Elaphroconcha* Gude, 1911; *Staffordia* Godwin-Austen, 1907; *Naninia* Sowerby, 1842; *Ratnadvipia* Godwin-Austen, 1899; and *Syama* Godwin-Austen (in Blanford & Godwin Austen), 1908, are similar in shell shape, but are much larger in size (ca. 15–50 mm diameter). The ariophantine *Macrochlamys* Benson, 1832, can have a similar shell, but is much larger, has a more acute spire, and generally is glossier. The ariophantine *Kalidos* Gude, 1911, is larger and, when similar in general shape, always keeled.

The durgelline helicarionids *Sakiella* Godwin-Austen, 1908, and *Satiella* Godwin-Austen, 1908, seem the most closely related, but both are larger for the same number of whorls, the former is higher-spired (but shares the spiral sculpture), and the latter is more loosely coiled and lacks sculpture (but shares the flattish spire).

Holotype: UF 285450 (1 ad), Station 418, 13°06'S, 49°13'E, Madagascar, Andavakoera, north of Betsiaka, 115 m, dry deciduous forest on limestone karst, 31 August 1995.

Paratypes: Stations 417 (AMS C203513, 1 ad; MNHN, 1 ad; ANSP 407927, 1 ad; UF 285449, 2 ad; UF 285476, 10 ad, 16 juv), 418 (UF 285475, 5 ad, 16 juv).

Description of holotype: Diameter 5.8 mm, height 3.3 mm, whorls 4.5, umbilicus 0.4 mm. Spire low, rounded dome-conic. Body-whorl periphery rounded; suture almost imperceptibly impressed; whorl shoulders forming a shallow gutter just below the suture, then flattish, sloping moderately. Aperture broadly, obliquely lunate; height 2.4 mm, width 3.1 mm; no downward deflection. Apertural lip with very narrow reflection beginning mid-basally and continuing to the umbilical insertion, where it widens slightly; otherwise unreflected. First 1.5 whorls 0.96 mm in diameter. Embryonic sculpture consisting of faint, close-set, parallel spiral lines, gradually increasing in strength. Body-whorl sculpture smoothish, with a silky luster due to minute, dense, parallel, spiral lines wavering slightly where they cross low, irregular growth lines. Color light brown above, lightening to yellowish white on base, translucent.

Shell variation, based on holotype and two extreme variants: Abbreviations: # specimen number, D1.5W diameter in mm of first 1.5 whorls (embryonic coiling tightness), Diam diameter in mm, Ht/D height/diameter,

UFcat# Florida Museum of Natural History (University of Florida) catalog number, Um/D umbilicus diameter/shell diameter, W/ln D whorls/natural logarithm of diameter (coiling tightness), Whrl Whorls.

UFcat#	#	Diam	Ht/D	Whrl	W/ln D	Um/D	D1.5W
285449	1	5.3	0.6	4.4	2.63	0.06	0.98
285449	2	5.6	0.5	4.3	2.49	0.06	0.95
285450	—	5.8	0.6	4.5	2.56	0.07	0.96

Etymology: For the local lens of karst (Malagasy "tsingy") that is its type locality.

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